

Recommend Specs language for RFP: Voith Transmission

Topic: Transmission Specification

Transmission Type: D864.6

Transmission (Conventional Powertrain)

The transmission shall be a Voith DIWA® Fully Automatic Transmission, Type D864.6. The transmission shall be equipped with a differential torque converter, an integral retarder and electronic controls. The retarder shall activate without the use of accumulators. Gross input power, gross input torque and rated input speed shall be compatible with the engine. The transmission shall be designed to operate not less than 300,000 miles on the design operating profile without replacement or major service. The transmission should be easily removable without disturbing the engine and accessible for service. A 3M mechanic, with optional assistance, shall be able to remove and replace the transmission assembly for service in less than 8 total combined man-hours. The transmission shall be equipped with an internal, disposable oil filter that allows for filter removal without the need to remove the entire oil supply. The filter shall be specified by the transmission manufacturer. The transmission shall include a viscous damping device (Hydrodamp, or approved equal), to minimize the introduction of engine torsional vibrations into the transmission.

The electronic controls shall be capable of transmitting and receiving electronic inputs and data from other drivetrain components and of broadcasting that data to other vehicle systems. Communication between electronic drivetrain components and other vehicle systems shall be made using a SAE J1939 communications network. Electronic controls shall be compatible with a 24 V electrical system, provide consistent shift quality, and compensate for changing conditions, such as variations in vehicle load, engine power and route topography. At a minimum, drivetrain components consisting of the engine, transmission, retarder, ASR, and anti-lock braking systems shall be powered by a dedicated and isolated ignition supply voltage to ensure data communication among components exists when the vehicle ignition is switched to the “on” position.

- a) The transmission shall be equipped with the SensoTop shift program, or approved equal. This feature enables the transmission electrical control unit to combine established shift programming with a maintenance-free topography sensor. This allows for step-less adaptation of gear speeds to all situations for improved driving performance and reduced fuel consumption.
- b) The transmission control system shall be capable of performing advanced diagnostic functions with ALADIN®, or approved equal, which monitors all sensors, actuators and major components for malfunction. In the event of a malfunction, the event shall be stored in memory for later recall. The transmission shall have the capability to be diagnosed via a laptop computer based diagnostic system that uses an icon menu and is equipped with help functions for simplified use. The diagnostic system shall be capable of storing and time stamping operational/service events. The diagnostic system will be able to generate a scalable, HTML tabular report for analysis.
- c) The diagnostic system shall be capable of directing the technician through the process of fault identification, troubleshooting and repair.

DEFAULT

A brake pedal application of 6 to 10 psi shall be required by the driver to engage forward or reverse gear ranges from the neutral position to prevent sudden acceleration of the bus from a parked position.

ALTERNATIVE

A brake pedal application of 15 to 20 psi shall be required by the driver to engage forward or reverse gear ranges from the neutral position to prevent sudden acceleration of the bus from a parked position.

The transmission's electronic control unit shall enable the operator to select shift programs between performance and economy to achieve the optimum blend of fuel savings. The transmission electronic control shall calculate the optimum gear shifting points based on measured topography, load condition, and vehicle acceleration.

DEFAULT

Automatic Neutral Function with Automatic Re-Engagement

The transmission, when in a forward gear, shall automatically shift the transmission to neutral when the vehicle registers zero road speed, engine is idle and service brakes are applied. If the status of any one or more of the three signals changes, the transmission immediately and automatically resumes forward mode operation.

ALTERNATIVE

Hill Holder

A vehicle hill holder function shall be integrated with an automatic or reduced engine load state function to prevent inadvertent vehicle movement while the transmission is not in a forward or reverse gear range.

ALTERNATIVE

Automatic Neutral Function with Manual Re-Engagement

The transmission shall automatically shift to neutral whenever the door brake interlock is applied or the parking brake is pulled for more than 5 minutes. The driver shall be required to first disengage the parking brake and then apply the service brake to re-engage a forward or reverse gear range.

The electronically controlled transmission shall have on-board diagnostic capabilities, be able to monitor functions, store and time-stamp out-of-parameter conditions in memory, and communicate faults through a diagnostic interface. The diagnostic interface shall be capable of directing the technician through the process of fault identification, troubleshooting and repair. The transmission shall trigger a visual alarm to the driver when the electronic control unit detects a malfunction. The transmission shall contain built-in protection software to guard against severe damage.

Transmission Cooling

The transmission shall be cooled by a dedicated stainless steel heat exchanger mounted directly to the transmission and supplied by the transmission manufacturer. The heat exchanger shall be sized to maintain the operating fluid within the transmission according to the manufacturer's recommended parameters of flow, pressure and temperature. The interface of the oil circuit between the transmission and the heat exchanger shall be made without the use of external hoses or piping. The transmission cooling system shall be matched to the retarder and engine cooling systems to ensure that all operating fluids remain within recommended temperature limits established by each component manufacturer. The engine cooling system should provide sufficient coolant bypass flow to the transmission cooling system when the engine thermostat is closed. Unless otherwise noted, the transmission cooler is to be the first component to see cold water from the radiator outlet. In addition, all return water piping, aside from the thermostat bypass line, is to be plumbed in after the transmission cooler.

Retarder (Transit Coach)

The powertrain shall be equipped with an integral retarder designed to extend brake lining service life. The application of the retarder shall cause a smooth blending of both retarder and service brake functions. Retarder application shall be 100% brake applied with the capability of modulation between three retarder stages. Retarder stages one (33%) and two (66%) will be activated in advance of the service brakes. Retarder stage three (100%) will be activated when the service brakes are applied.

Actuation of ABS and/or automatic traction control (ATC) shall immediately override the operation of the brake retarder.

DEFAULT

Brake lights shall not illuminate when the retarder is activated.

ALTERNATIVE

Brake lights shall illuminate when the retarder is activated.

ALTERNATIVE

Throttle Pedal Activation of the Retarder

The retarder shall become partially engaged (approximately one-third of its total application, with a resulting deceleration of no greater than 0.077 g) when the throttle pedal is completely released. Maximum retarder shall be achieved when brake pedal is depressed prior to engagement of service brakes, with a maximum resulting deceleration of approximately 0.20 g in an empty bus. The resulting decelerations specified include the effects of engine braking, wind resistance and rolling resistance.

The thermostatically controlled cooling fan shall be activated when the retarder is engaged and the coolant temperature reaches the maximum operating temperature established by the engine and transmission manufacturers.

DEFAULT

Accessible Retarder Disable Switch

The retarder disable switch shall be accessible to the seated driver.

ALTERNATIVE

Retarder Disable Switch Not Accessible

The retarder disable switch is not required to be accessible to the seated driver.

ALTERNATIVE

Disabling retarder shall be recorded for Agency data collection.

ALTERNATIVE

Unless specified by the transmission manufacturer, a retarder disable switch will not be supplied.